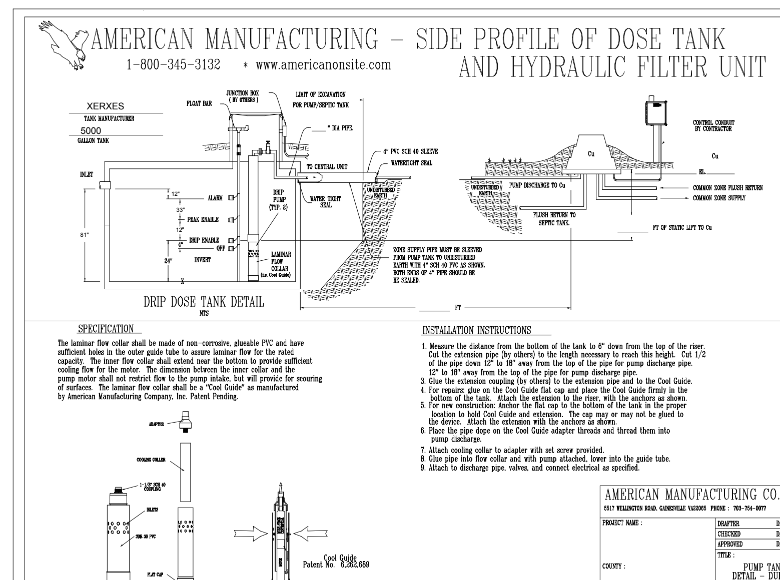

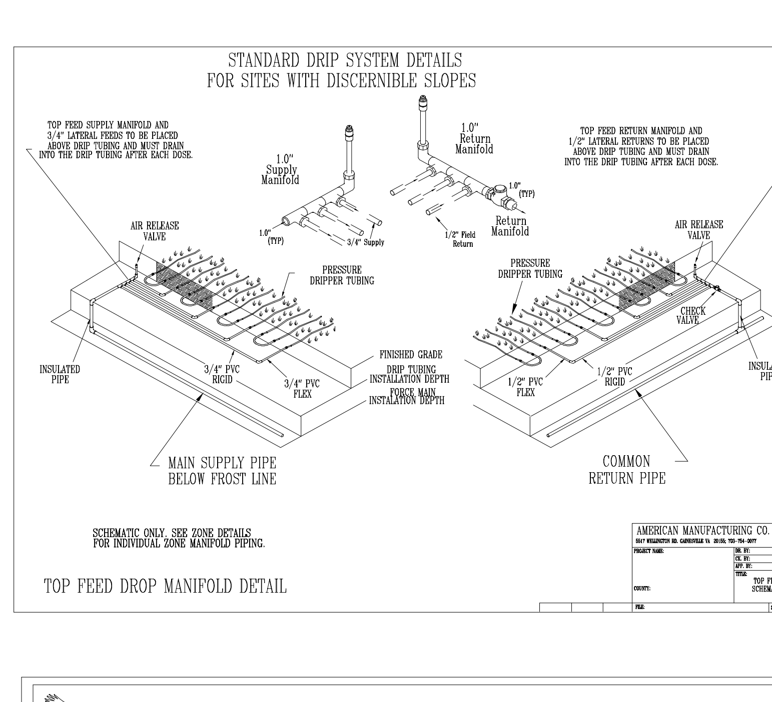

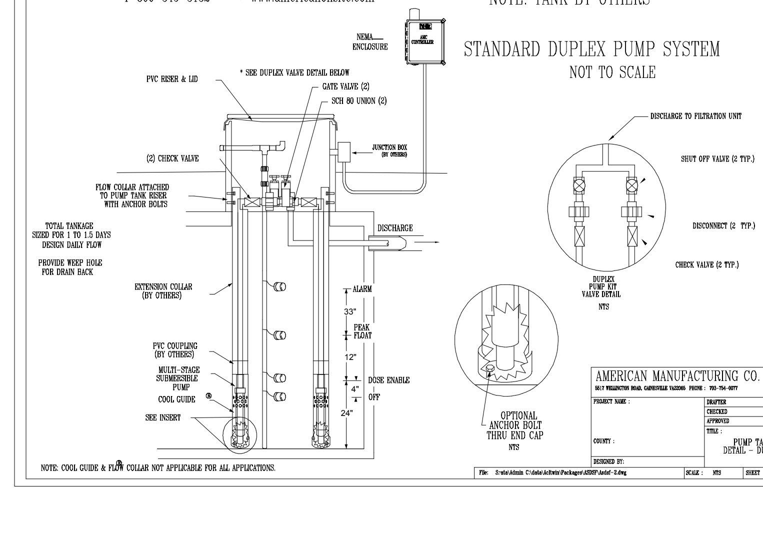

AMERICAN DRIP SYSTEM
STANDARD ENGINEERING SPECIFICATIONS
ASD 25-(25GPM) UNIT w/Siemens Controller

1.01 GENERAL

A. Furnish and install complete drip irrigation system including all valves, piping, filters, flow meter, controls, electrical supply & components, header piping, pressure compensating BIOLINE drip tubing, air release/vacuum breaker valves, fittings, pumps, pump hoists (if applicable), dedicated modem/data/phone line, float switches, hydraulic unit enclosure/building (heated, lighted, w/ concrete floor & floor drain), supports and appurtenances described, shown on drawings and as needed to place the irrigation system into operation.

B. Drip Dispersal System Package to be provided by single source. All remaining required materials, not included in Drip Irrigation System Package list, to be provided by contractor or owner.

C. Submittals for equipment shall be submitted by CONTRACTOR to ENGINEER as required.

D. Drip Dispersal System Package to be provided by American Manufacturing Company, Inc., 5517 Wellington Road, Gainesville, Virginia 20155 (Phone: 800-345-3132) or equivalent.

2.01 EFFLUENT PUMP & FILTRATION CONTROLS

A. Provide complete pump and filter control system consisting of the pump control panel, processor/controller panel, connection to a dedicated modem/data/phone line, flow meter and field control devices such as solenoid valves, float switches and AMERICAN MFG. COMPANY, INC. Model ASD 25 - (25 gpm) hydraulic unit mounted on a 30" x 22" aluminum skid to be housed in an insulated fiberglass enclosure or building enclosure.

B. The system control panel(s) shall be in a NEMA-4X enclosure. For those panels where "Hand-Off-Auto" (HOA) switches for zones, pumps and master valve are not mounted on backplate, those panels shall be provided a with hinged door. Duplex alternating pumps are required for all i nstallations. The panel(s) shall house the following:
1. Circuit breaker for each pump motor starter.
2. Magnetic starter, sized for pump motor HP, with overload protection in each phase.
3. "Hand-Off-Auto" selector switches, run indicating lights and running time meter and cycle counters for each pump.
4. Terminal blocks for field wiring.
5. Provide imbedded PC interface and program logic with input/output (I/O) cards.
6. Provide logic in controller to prevent pumps from starting for set time when power is restored after power failure.
7. Auxiliary contacts of starters for remote "run" indication.
8. Components shall be UL Listed.
9. Wires are to be color and number coded.
10. Schematic to be provided with control.
11. Provide accommodation for optional remote alarm.
12. Installation to be according to all local codes.

C. The controller shall be a Siemens to be housed inside of the NEMA-4X enclosure. All input/output (I/O) cards and electrical control components shall be located in the NEMA-4X enclosure. The controller shall have a modem for direct connection to a phone line. The controller shall include logic to do the following:
1. Alternate pumps following each dose.
2. Dose drip zones either individually or two at a time.
3. Provide for automatic filter backflushes based on either a total volume amount or pressure differential.
4. Provide for automatic Forward Field Flushing based on a total volume amount or time schedule.
5. Provided threshold monitoring for flow variances.
6. Dosing to be controlled by a float switch enable time dosed system.
7. The system controller shall provide for a zone to be "rested" or taken "out of service". The controller shall have the capability to bypass the zone(s) that have been taken out of service and dose the next available zone with normal sequence continuation.

2.02 FLOW METER
The effluent flow meter shall be 1.0 inch diameter Multi-Jet with flange connections manufactured by Master Meter or approved equal.
1. Meter shall be dial type with total enclosure and an electrical output register.
2. Meter is to have a 1 pulse per gallon contact head.
3. Transmitter shall be two wire with pulse output proportional to flow.

2.03 EFFLUENT PUMPS

A. Submersible Turbine Option - Specific Model as per required head conditions.
1. Minimum duplex effluent pumping system.
2. Must be able to satisfy the three operating conditions: multiple zone dose, individual zone forward flush, and filter backwash.
3. Pumps to be UL Listed.
4. Pumps to be hardwired in a watertight junction box per local code.
5. Each pump to have individual breaker, contractor and capacitor (if required).
6. Pumps to have check valve, disconnect and shut-off valve on supply pipe prior to hydraulic unit.
7. Pumps and motors to be supplied as part of American Manufacturing Drip Irrigation System package.

B. Flooded Suction Option (skid mounted) - Specific Model as per required head conditions.
1. Minimum duplex effluent pumping system.
2. Must be able to satisfy the three operating conditions: multiple zone dose, individual zone forward flush, and filter backwash.
3. Pumps to be UL Listed.
4. Pumps to be hardwired in a watertight junction box per local code.
5. Each pump to have individual breaker, contractor and capacitor (if required).
6. Pumps to have check valve, disconnect and if required a shut-off valve on supply pipe prior to hydraulic unit.
7. Pumps and motors to be supplied as part of American Manufacturing Drip Irrigation System package.
8. Suction line to have a foot-strainer located a minimum of 6 inches off of the bottom of the suction tank.

2.04 FLOAT SWITCHES
A. The drip system is to contain four (4) float switches (Off Level, Dose Enable, Peak Enable and High Level).
1. All floats to have two-conductor cords and be hardwired in a watertight junction box.
2. All floats to be UL Listed.
3. All floats to have normally open contacts.
3. All floats to send signal to PLC when activated.
4. All float switches to be installed per local code.

B. The bottom two floats (Off Level & Dose Enable) shall be:
1. 115 volt
2. Narrow angle pilot duty switch.
3. Supplied by American Mfg. Co., Inc.

C. The top two floats (Peak Enable, High Level) shall be:
1. 115 volt
2. Wide angle encapsulated differential switches.
3. Supplied be American Mfg. Co., Inc.

2.05 HYDRAULIC UNIT FILTRATION RACK

A. Automatic Filter Assembly
1. The automatic filter shall be a package assembly filter battery consisting of three - 3/4 inch single disc filters.
2. Filter operation shall be controlled from the computer controller by electrically activated valves.
3. Filter battery shall have the following:
a. inlet/outlet diameter: 3/4 inch male
b. minimum backflush pressure: 50 psi
c. maximum working pressure: 140 psi
d. single filter surface area: 24.8 sq. in.
e. single filter filtering volume: 5.8 cu. in.
f. length of flushing period: 10-15 seconds/filter
g. amount of water used for flushing battery: 15 gallons
h. filter rings: 140 mesh - 115 micron
i. head loss: 10.8 psi at 25 gpm

4. Backflush procedure to operate as follows
a. Computer/control calls for backflush to start.
b. Backflush initiated by either a pressure differential across filters or a set volume amount through unit.
c. Hydraulic valves close discharge and open backflush outlet on one bank at a time which takes that filter out of service.
d. Water supply for backflush is provided through the filters in service.
e. Backflushing takes place for 10-15 seconds per filter; discharge of flush water is to wet well.
f. Remaining filters are sequentially backflushed until entire battery has been cleaned.
5. Automatic Filter battery shall be Arkal/Netafim standard 3/4" disc filters supplied by American Manufacturing Co., Inc.

2.06. HYDRAULIC UNIT HOUSING OPTIONS

A. FIBERGLASS ENCLOSURE
1. Fiberglass enclosure shall be required for use with submersible pump option.
2. Enclosure shall be insulated and equipped with a thermostatically controlled heater.
3. Heater shall be thermostatically controlled. The heater shall be 225 watt & 120 volt.
4. Insulation shall be made with two layers of aluminum separated by 5/16 inch dead air space with a minimum R-value of 8.3.
5. Submersible pump option can also be used with System Control Building option.
B. SYSTEM CONTROL BUILDING
1. Building enclosure shall be required for use with flooded or end suction pump option.
2. Hydraulic unit/control building shall be heated, lighted and have proper ventilation with concrete slab type floor and with a corner floor drain.
3. Building to be located on a solid foundation.
4. Enclosure building shall be sized to adequately house the filtration skid mounted unit, control panels and any other required equipment. Minimum 2 foot spacing should be provided around perimeter of skid unit to provide adequate room for system maintenance.
5. Access doors to the building must be wide enough to accept a fully assembled hydraulic skid unit.
6. Building material and type to be as specified on design drawings.
7. Electrical requirements are to be as specified on plans.
8. Plumbing to and from building should be taken into consideration prior to construction on building.
9. A dedicated data/telephone line is to be provided for Remote Monitoring.
10. Additional optional equipment to be specified by designer: 1) exhaust fan, 2) work table and chair for PC, 3) telephone line in addition to the one required for the Remote Monitoring (2 total) and 4) running water (i.e. garden hose for cleanup).

2.07 VALVES

A. Pump Master Control Valve
1. Shall be hydraulic valve with integral diaphragm operated by hydraulic pressure to control the irrigation pump discharge.
2. Valve body and cover shall be 1.5 inch diameter reinforced nylon.
3. Springs shall be stainless steel.
4. Valve shall have threaded end connections.
5. Inlet pressure range shall be 15-140 psi.
6. Valve shall have slow drip-tight closure to prevent water hammer.
7. Valve control shall be electrically from the computer controller.
8. Valve shall be normally open (NO) with 24 volt, 8 watt solenoid.

B. Field Control Valves
1. Shall be hydraulic valve with integral diaphragm operated by water pressure to operate the drip system discharge in both the irrigation mode and forward field flush mode.
2. Valve body shall be 1.0 inch diameter plastic .
3. Springs shall be stainless steel.
4. Valve shall have threaded end connections.
5. Inlet pressure range shall be 15-140 psi.
6. Valve shall have slow drip-tight closure to prevent water hammer.
7. Valve control shall be electrically from the computer controller.
8. Valve shall be normally open (NO) with 24 volt, 2.2 watt solenoid.

C. Check Valves
1. Shall be of the swing-type.
2. Shall be constructed of heavy cast iron, brass or bronze.
3. Shall have suitable flanged or threaded connections.
4. Shall have a non-corrosive shockless chamber if applicable.
5. Shall be Standard AWWA approved or equivalent for use in wastewater applications.

D. Shut-off Valves
1. Shall be iron, brass, bronze or pressure rated PVC.
2. Shall have IPS, flanged or solvent weld connections.
3. Shall be Standard AWWA approved or equivalent in wastewater applications.

E. Air Release Valves:
1. Shall be placed on high point of each sub-zone supply and return manifolds and at high point on common supply and return manifolds as per design.
2. Shall be 1.0-2.0 inch diameter (or greater where required) combined air release and vacuum breaker valve.
3. Shall operate to release or admit air from or into the line.
4. Shall be suitable for the designed working pressures in the line.
5. Valve body shall be high strength fiberglass reinforced plastic with operating parts of non-corrosive materials or other appropriate materials as required.
6. Valves shall be A.R.I (kinetic) Combined Air Release & Vacuum valve or Guardian dual function kinetic Air Release & Vacuum Valve or equivalent.

F. Pump Suction Foot Valves
1. Shall have cast iron or brass body.
1. Shall have IPS or standard 125 pound flange connection.
2. Shall have rubber flapper seats or a machined surface with a tight seal.
3. Shall be a Flowmatic foot valve or equivalent.

3.01 EFFLUENT PIPING/WIRING

A. Gravity Piping
1. Shall be schedule 40 PVC DWV as a minimum.
2. Fittings shall be schedule 40 PVC suitable for underground installation.
3. All joints shall be solvent welded with the use of purple primer and PVC glue.

B. Non-Dripper Pressure Pipe
1. All non-dripper pressure pipe shall be schedule 40 PVC pressure rated.
2. Rigid piping shall be ASTM 1120 for use with solvent welded schedule 40 fittings.
3. All joints shall be solvent welded with the use of purple primer and PVC glue.
4. All flexible PVC shall be schedule 40 PVC and shall be readily assemble using schedule 40 PVC fittings and flexible PVC to rigid PVC adhesive. The flexible PVC should be solvent welded with the use of purple primer and PVC glue.
5. Top feed Supply and Return Manifolds shall be used on sites with drainfield slopes of greater than 10% or as required by manufacturer. Top Feed manifolds shall be constructed of schedule 40 PVC pipe and fittings.

C. Drip Tubing
1. All dripper tubing shall have the following characteristics:
a. Dripperline shall be ½ inch diameter nominal O.D. Polyethylene tubing with a pressure compensating mechanism allowing a constant discharge rate from each dripper opening. Inside diameter shall not be less than 0.57 inch.
b. Dripperline discharge rate per orifice shall be 0.61 gallons per hour. Orifice spacing shall be 2 foot on center.
c. Dripper pressure compensating mechanism shall maintain a uniform dripper flow rate over a pressure range of 5-60 psi. Dripper mechanism shall be activated at 5 psi.
d. Dripper diaphragm shall be constructed of synthetic elastomer to withstand effects of chemicals, fertilizers and acids (to a pH of 2).
e. Diaphragm shall have a continuous self-cleaning feature which continuously measures the actual flow rate. Particle that could clog the dripper create back pressure and push back the diaphragm to continuously clean and flush particles from the regulating chamber of the diaphragm.
f. Irrigation dripperline shall be equal to Netafim Irrigation, Inc. BIOLINE pressure compensating dripperline for wastewater as distributed by American Manufacturing Company, Inc.
g. Drip tubing shall be installed where indicated on design drawings.
2. The dripper lines are to be automatically scoured (forward flushed) at a minimum of one time per month or once every prescribed number of cycles with a minimum scouring velocity of 2 feet per second at the distal end of each lateral.
3. The drip tubing manufacturer shall provide a head loss chart for various drip tubing lateral lengths to provide for a minimum scouring velocity of 2 feet per second at the distal end of each lateral.
4. Dripperline shall be installed along contour and in accordance to manufacture's requirements.
5. Drip tubing shall be connected to header lines with special connectors provided by manufacturer to provided water tight connection.
6. Drip tubing is NOT to be glued but rather connected to PVC with the barbed-typed fittings approved by the manufacturer.

D. Field Wiring
1. All electrical wiring from the computer/controller to the field control valves shall be furnished and installed by system installer.
2. All field wiring shall be appropriately sized by an electrician according to local code.
3. All electrical cables shall be U.L. Listed suitable for direct burial.
4. Field wire splices shall be installed in suitable wire splice pull boxes with waterproof connections for access to splice connections. The boxes shall be well marked (not with metal posts or rods) and have structural capacity for in-ground installation and light vehicular yard care traffic. At-grade access is preferred.

4.01 INSTALLATION & CONSTRUCTION

A. System Installation
1. Pumps, filtration rack, hydraulic unit building, controls, computer, floats and valves shall be installed according to plans and in accordance with appropriate regulations.
2. Non-dripper piping and electrical connections shall be made in accordance with all appropriate codes and regulations.
3. Hydraulic unit/control building shall be heated and lighted with concrete slab type floor and with a corner floor drain. Exhaust fan installation is optional. Building to be constructed on solid foundation and in accordance with the design drawings.
4. Dedicated telephone modem line is to be installed prior to system startup.
5. Drip Tubing Installation (See "Construction Notes" section below):
a. NO wet weather installation.
b. Prepare field location for installation.
c. Dig header ditch for field manifold.
d. Install dripper tubing.
1. Install all drip tubing along contour.
2. Install at depth specified on plans.
3. Install drip tubing with either vibratory plow, standard trencher (i.e. Ditch Witch), or by hand.
4. See construction notes for addition installation techniques.
e. Install loops (flex tubing).
f. Dig ditches for conveyance lines.
g. Dry fit pressure lines and field manifolds.
h. Glue all fittings and place valve boxes.
I. Install electrical (and phone line if applicable).
j. Check power supply and power up unit.
k. Provide one day volume of clean water for startup.
l. Pressure check all fittings and lines
m. Inspection of field and loops.
n. Flush all fields through the air release valves.
o. Set run time for Central Unit.
p. Check setup values against calculated values.
q. Find leaks and repair.
r. Backfill once lines and fields are determined to have no leaks. Back filling is to be controlled to prevent the damaging of pipes or fittings
s. Grade and seed site.

B. Supervisory & Technical Support
1. American Manufacturing Company, Inc. or pre-approved alternate supplier shall provide supervisory services and technical support during installation of the drip effluent disposal system.
2. Services to be provided are as follows:
a. Supervise/inspect installation of filtration system, float switches and pumping systems.
b. Technical support for installation of the control panels and PC.
c. Program the computer (PC).
d. Supervise/inspect installation of subsurface pressure compensating drip irrigation tubing.
e. Supervise/inspect installations and hookups of automatic valves.
f. Supervise/inspect installation of connections of drip tubing to supply and return manifolds.

C. Drip Dispersal Field Construction Notes
1. All installation and construction techniques shall conform to state and county codes pertaining to on site sewage systems and the permit for this site.
2. The installation of this system shall be in accordance with specifications and procedures as supplied by the Manufacturer of the equipment.
3. The drip tubing shall be installed using a vibratory plow, trencher, or by hand.
4. All PVC pipe and fittings shall be PVC SCH 40 Type 1 rated for pressure applications. All glued joints shall be cleaned and primed with purple (dyed) PVC primer prior to being glued.
5. All cutting of PVC pipe, flexible PVC and dripper tubing of size 1 1/2" or smaller shall be accomplished with pipe cutters approved by American Manufacturing Company, Inc. No sawing of PVC, flexible PVC or dripper tubing of size 1 1/2" or smaller allowed.
6. All PVC pipe, flexible PVC and dripper tubing in the work area shall have the ends covered with duct tape to prevent construction debris from entering the pipe. Prior to gluing, all joints shall be inspected for and cleared of any construction debris.
7. All automatic valves (zone valves & field flush return valves) shall be installed with isolation valves, bypass valves, and disconnects (i.e. unions, flanges) for manual field operation during field maintenance events. All valves must be provided with at-grade access.
8. Drainfield supply and return lines and manifolds to be installed at adequate depth to prevent freezing. Horizontal spacing between the dripper lines and the installation depth to be as specified.
9. No activity on drainfield area other than minimum required to install system. Do not park equipment, drive large equipment over or store materials on drainfield area.
10. No wet weather installation is permitted.
11. The contractor shall be certified by American Manufacturing Company, Inc. to install this type of system and shall hold a pre-construction meeting with the individuals responsible for soil evaluation, permitting and inspections prior to site work beginning to insure protection of the site conditions and to ensure the system is installed according to design.
12. If site conditions are determined to require the installation of the system to deviate from these plans, all work shall stop immediately and the designer shall be notified. Any ongoing work shall be at the sole responsibility of the contractor.
13. All force mains shall be tested for leaks prior to drip tubing installation and prior to system startup. Uncovered force mains shall be visibly inspected for leaks. If a leak is suspected in covered force mains then the force main shall be re-tested at a minimum pressure of at least percent above the design operating pressure, for at least 30 minutes. There shall be no discernible leakage.

D. System Startup
1. A representative from the manufacturer shall be on hand for system startup.
2. ½ day of training shall be provided by the factory trained representative supplying the drip irrigation system equipment.

5.01 SYSTEM OPERATION

A. Time Dosing
1. The drip dispersal system shall utilize a time dosing technique via the automatic controller specified in Section 2.01.
2. System shall utilize level sensing devices (standard mechanical differential float switches) located in a dosing tank downstream from the pretreatment process.
3. When activated by the rising level of effluent in the dosing tank, the controller shall enable the disposal cycle, and as dictated by the controller, pump the effluent through 115 micron disc filters and then to final drip dispersal.
4. The pump control panel shall be equipped with four float switches to control the timed doses to be discharged.
5. The four float switches, "Redundant Off", "Standard Dose Enable", "Peak Dose Enable" and "High Level" shall function as follows:
a. Redundant Off - The water level must be high enough to overcome the "Redundant Off" (first & bottom) float in order for the pump to be permitted to run in automatic mode.
b. Standard Dose Enable - When the water level rises high enough to overcome the "Standard Dose Enable" (second) float and the time clock has timed out the preset time delay (rest time between dosing cycles), the pump will activate and the lead zone(s) is dosed. The pump will continue to run for the length of time required to disperse of the specified dose volume and then shut off. The pump will remain off until the internal time clock again times out the preset time delay which the pump will activate (as long as the "Standard Dose Enable" float is still up) and will run again until the specified volume is pumped. This process will repeat until the water level drops below the "Standard Dose Enable" float and the pump run timer has timed out.
c. Peak Dose Enable - The control system will be equipped with a "Peak" circuit to manage peak flows and excess water use. If the rising water level activates the "Peak Dose Enable" (third) float, the "Pump - Off - Pump & Alarm" switch is set to "Pump", and the preset time delay has been exceeded ("Peak Dose Enable" rest between cycles), the lead zone will be dosed. When the "Peak Dose Enable" circuit has been deactivated the normal pumping cycle will resume. If the rising water level activates the "Peak Dose Enable" (third) float, the "Pump - Off - Pump & Alarm" switch i s set to "Pump & Alarm", and the preset time delay has been exceed ("Peak Dose Enable" rest between cycles), the lead zone will be dosed and the "Peak Dose Enable" alarm will be activated. The audio portion of the alarm may be silenced by pressing the Test-Normal-Silence switch to the silence position. When the "Peak Dose Enable" float has returned to the down position the alarm will be deactivated and the normal pumping cycle will resume.
d. High Level - If the water level rises enough to overcome the "High Level" (fourth) float, the audiovisual alarm will activate. The audio portion of the alarm may be silenced by pressing the Test-Normal-Silence switch (located on the outside of the control panel) to the silence position. The alarm circuit will latch until manually reset after the "High Level" float returns to its normal (down) position. The alarm circuit is manually reset by switching the High Level Reset/Off-Normal switch (located inside the control panel on the inner door) to the Reset position then back to normal.
Used to indicate level of effluent in final pump tank.

B. Automatic Disc Filtration and Backflush
1. Submersible or centrifugal pumps (duplex) shall deliver unfiltered effluent to each of the disc filters during the normal forward filtration process.
2. Each filter shall automatically go through a backflush cycle to clean all of the disc filters based on:
a. A certain specified volume of effluent passes forward through the flow meter.
b. A specified differential pressure reading between upstream and downstream of the disc filters is detected.
3. Backflushing shall proceed as follows:
a. One filter valve shall close, thus blocking the flow of unfiltered effluent to that filter. b. After a short delay, the other flushing valves shall open.
c. The clean effluent from the forward filtration filters shall be directed to the outlet manifold.
d. Filtered effluent from the outlet manifold shall then flow in reverse direction (in through the spine) of the filter to be backflushed and into the backflush nozzles, spinning the loosened discs and flushing the captured debris out the drain manifold.
e. The accumulated impurities shall discharge back into the pretreatment unit.
f. The backflush procedure shall last approximately fifteen to thirty seconds (or longer if necessary) then the back flushing valve shall close.
g. Only after the first filter has completed its backflushing cycle, will the next filter begin its cycle of backflushing in the same manner as the first until all the filters have been backflushed.
h. Effluent shall then be pumped through clean disc filters, then through the flow meter and finally through the outlet manifold to the drip field supply line.
C. Forward Field Flush
1. Each drip zone shall automatically undergo a periodic "Forward Field Flush" every fifty cycles or 15 days (whichever occurs first) to scour the inside of the dripper tubing.
2. Forward Field Flush to be accomplished by automatically opening a Zone Return valve to allow effluent to return to the head of the system after passing through the drip field.
3. 1.6 gpm per distal lateral connection shall be provided to maintain minimum scouring velocity of 2 feet per second at the distal end of each lateral.
4. Zones shall Forward Field Flush individually.
5. Flushing volume to be a minimum of three times the volume of the drip tubing.

6.01 DRIP SYSTEM WARRANTY

A. For one year (12 months) after the date of purchase, American Manufacturing Company, Inc. or drip system supplier will repair or replace a ny product or portion thereof which proves to be defective due to materials or workmanship of American Manufacturing Company, Inc. American Manufacturing Company, Inc. reserves the right to repair or replace defective materials at their discretion.

B. This warranty does not cover the following conditions:
1. Defects or problems caused by improper installation or maintenance of materials.
2. Abuse, neglect or accidental damage of products.
3. Normal maintenance or upkeep of products.
4. Lightning, war, floods, or other acts beyond our control.
5. Misapplication of our products for their designed purpose, or misapplication according to local, state or national codes when in effect.
C. Defective or warranty materials must be returned to American Manufacturing Company, Inc. or a place designated by American Manufacturing Company, Inc. All returns must be accompanied by a return authorization number supplied by American Manufacturing Company, Inc.
D. American Manufacturing Company, Inc. will in no way be responsible for any losses or damages incurred by failure of equipment, parts or service.
NOTE: Some states do not allow exclusion of damages so this may not apply to you.
E. There are no other warranties written or implied.

6.02 SERVICE & MAINTENANCE
A. Contractor shall provide a one year maintenance warranty beginning at the expiration manufacturer's original one year warranty (see above "Drip System Warranty).

B. American Manufacturing will provide "Remote Operation & Monitoring" for a period of two years from system startup.

C. Upon expiration of the manufacturer's initial "Remote Operation & Monitoring" agreement additional years of "Remote Operation & Monitoring" may be purchased. Contact manufacturer for details.

DRIP SYSTEM SPECIFICATIONS

Specifications

DISC FILTERS - Disc filters shall be oblique filter, entirely of plastic, with 3/4" male end connections to NPT schedule 40 pressure PVC. The filter elements shall consist of grooved rings, mounted on a spline, forming a cylindrical filter body. The rings are to kept together by a spring seated at the bottom of the filter cover. The out-in filter shall be of the screw in type with nitrilic rubber o-ring seal. The body materials shall be polyester, the spline and rings shall be made of polypropylene, and the spring shall be stainless steel. The nominal filtration capacity of the filter shall be 115 microns.

DRIPPER TUBING - The dripper tubing shall be Netafim Bioline pressure compensating dripperline wastewater. The tubing shall be nominal 0.61 gallons per hour (+/-5% flow rate from 7 to 60 psi). The tubing shall function as a turbulent flow emitter between 0 and 7 psi, ensuring that the nominal design flow is not exceeded at system start-up. The tubing shall be polyethylene 120 psi rating. Tubing connections and splice connections shall be manufactured specifically for tubing and for connection to standard schedule 40 NPT adapters.

AUTOMATIC CONTROL VALVES - The automatic control valves shall be 1.0" diameter solenoid activated diaphragm valves by Bermad. The body and cover shall be reinforced nylon. The metal parts shall be stainless steel, the diaphragm shall be nylon-fabric reinforced polyisoprene. The seals shall be Buna-N. These valves shall operate electrically using hydraulic pressure to open and to close.

MASTER VALVE - The automatic master control valves shall be 1.5" diameter activated diaphram valve by Dorot. The body and cover shall be reinforced nylon. The metal parts shall be stainless steel, the diaphragm shall be nylon fabric reinforced polyisoprene. These valves shall operate electrically using hydraulic pressure to open and to close.

RETURN PRESSURE ASSEMBLY FOR ZONE RETURN VALVE - The automatic zone return valve shall, in the event the drip zones are over 10 feet in vertical elevation above the hydraulic unit, have installed a "return pressure assembly". The assembly is to be used to prevent the line from draining after or during each dose.

GENERAL VALVES - All ball valves shall be Schedule 40. Check valves shall be of the swing check design of metallic bronze or brass with corrosion resistent metal hinge pin for use in wastewater. Gate and Globe valves shall be true-union pvc type with stem adapters for surface operation.

FLOW METER - Flow meter shall be dial-type multi-jet 5/8" to 2" meter with total enclosure and an electrical output register. The meter shall be bronze with externally threaded ends with bronze threaded union end connectors. The meter shall provide contact closure corresponding to defined volume increments. Maximum switch current 500mA and maximum switching voltage 32 volts (AC or DC) for output register.

FLOAT SWITCHES - The system will operate on four floats. The bottom two floats ("Off" and "Enable" shall be Connery 10 amp. 115 volt, narrow angle supplied by American Manufacturing. The top two floats ("Peak" and High Level") shall be Connery 10 amp, 115 volt wide angle differential microswitches supplied by American Manufacturing.

GRAVITY PIPING - All gravity piping shall be schedule 40 PVC DWV as a minimum. Fittings shall be Schedule 40 PVC suitable for underground installation. All joints shall be solvent welded with the use of primer and PVC Glue.

NON-DRIPPER LINE PRESSURE PIPING - All non-dripper line pressure piping shall be PVC Schedule 40 pressure rated. Ridgid piping shall be standard ASTM 1120 for use with solvent welded Schedule 40 fittings. Flex piping shall be Schedule 40 PVC flex pipe for use with pressure fittings.

DISCONNECTS - Piping disconnects shall be PVC Schedule 80 unions.

AIR RELEASE VALVES - Air release valves shall be 2" diameter Guardian air release and vacuum valves by Netafim. Body shall be made of fiberglass reinforced U>V> Protected nylon. Maximum working pressure 150 psi.

WIRE SPLICES - Field wire splices shall be installed in suitable wire splice pull boxes with waterproof connections for access to splice connections. The boxes shall have structural capacity for in ground installation and light vehicle yard care traffic.

SPECIAL DRIP EQUIPMENT - All non-specified drip equipment shall be as supplied by American Manufacturing Company, Inc. including the controls, drip hydraulic unit, pumps, and special fittings.

HEATER - The hyrdraulic unit shall be equipped with a thermostatically controlled heater. The heater shall be 225 watt & 120 volt.

HYDRAULIC UNIT ENCLOSURE - The enclosure shall be made of fiberglass with latching cover.

ENCLOSURE INSULATION - Insulation shall be made with two layers of aluminium separated by 5/16 inch dead air space with a minimum R-value of 8.3.

TOP FEED MANIFOLDS - Top feed supply and freturn manifolds shall be made with pressure rated Schedule 40 PVC>

ZONE RESTING OPTION - The system controller shall allow for a zone to be rested or taken out of service. The controller shall have the capability to bypass a zone that has been taken out of service and dose the next available zone.

PIPE BEDDING - In ground piping shall be installed according to local codes. Piping shall be installed on original soil or suitably compacted fill or gravel bedded excavaions on original soil. The free standing piping shall be schedule 40 PVC and assembled with restraint joints.

HYDRAULIC UNIT - Drip hydraulic unit by American Manufacturing must be mounted on an aluminium skid with an insulated enclosure with a removeable lid for maintenance and monitering purposes.

REMOTE OPERATION & MONITERING - This system requires Remote Operation and Monitering package. A dedicated data/phone line will need to be installed and connected to the Drip controller prior to system start-up. Data logs will be kept and periodically provided to the system permitting agency.

INSTALLATION & CONSTRUCTION - All installation & construction shall follow the guidelines of American Manufacturing Company and shall be provided by American Manufacturing Company prior to system construction.

General Construction Notes - American Manufacturing "Perc-Rite" Drip

1) All installation and construction techniques shall conform to state and county codes pertaining to onsite sewage systems and the permit of this site.
2) The installation of this system shall be in accordance with specifications and procedures as supplied by the Manufacture of the equipment.
3) The drip tubing shall be installed using a vibratory plow, trencher, or by hand.
4) All tubing to be installed along contour.
5) All PVC pipe and fittings shall be PVC SCH 40 Type 1 rated for pressure applications. All glued joints shall be cleaned and primed with purple (dyed) PVC primer prior to being glued.
6) All cutting of PVC pipe, flexable PVC and dripper tubing of sizes 1 1/2" or smaller shall be accomplished with pipe cutters approved by American Manufacturing Company, Inc. No sawing of PVC pipe, flexible PVC or dripper tubing of size 1 1/2" or smaller.
7) All PVC pipe, flexible PVC and dripper tubing in the work area shall have the ends covered with duct tape to Prevent construction debris from entering the pipe. Prior to gluing, all joints shall be inspected for and cleaned of any construction debris.
8) All automatic valves (zone valves & field flush return valves) shall be installed with isolation valves, bypass valves, and disconnects (i.e. unions, flanges) for manual field operation during field maintenance events. All valves must be provided with at-grade access.
9) Drain field supply and return lines and manifolds to be installed at adequate depth to prevent freezing. Horizontal spacing between the dripper lines and the installation depth to be as specified.
10) No activity on drain field area other than minimum required to install system. Do not park equipment, drive large equipment over or store materials on the drain field.
11) No wet weather installation is permitted.
12) The contractor shall be certified by American Manufacturing Company, Inc. to install this type of system and shall hold a pre-construction meeting with the individuals responsible for soil evaluation, permitting and inspections prior to site work beginning to insure protection of the site conditions and to ensure the system is installed according to design.
13) If site conditions are determined to require the installation of the system to deviate from these plans, all work shall stop immediately and the designer shall be notified. Any ongoing work shall be at the sole responsibility of the contractor.
14) All force mains shall be tested for leaks prior to drip tubing installation and prior to system startup. Uncovered force mains shall be visibly inspected for leaks. If a leak is suspected in covered force mains then the force main shall be re-tested at a minimum pressure of at least 100% above the design operating pressure, for at least 30 minutes. There shall be no discernable leakage.
15) ASD 15 & 25 Hydraulic units to be placed on a bed of gravel for drainage.
16) If standing groundwater is a problem a screened drain to daylight is required.

COLD WEATHER INSTALLATION NOTES
Minimum construction techniques for all American "Perc-Rite" Drip systems in cold weather climates:
1) "Top feed" manifolds should be used on all sites with a discernible slope to allow for proper drainage of the manifolds and the 3/4" and 1/2" lateral connectors into the drip tubing.
2) The main supply and return lines shall be installed below the frost line and shall feed the shallow "top feed" manifolds with a single vertical section of insulated sch 40 PVC pipe. Insulation shall be minimum 1/2" thick foam insulation (or equivalent).
3) On flat sites where "top feed" manifolds will not drain therefore requiring the use of side feed manifolds, 12" cover is recommended between highest point of 1/2" black flexible PVC pipe (non loop connections) and final grade. On drip tubing installations less than 12" this would require additional cover over the header ditch area to create the 12" separation. Any additional cover is it to be graded and tapered into landscape. Please see note on loop connections below.
4) Dense vegetation turf cover to be established over supply trench, return trench and tubing prior to 1st ex-posure to cold weather. If vegetation cannot be established, then trenches and tubing to be covered with a thick layer (minimum 6") of mulch, straw/hay, etc. until such turf cover is established. Cover must be stabilized and maintained until dense vegetative turf is established. Amount of cover may need to be adjusted to ac-count for settling.
5) All valve boxes that house "remote zone valves" shall be insulated by contractor. Insulation to consist of either blue board, bagged Styrofoam peanuts or equivalent. If fiberglass insulation is used it must be sealed to prevent it from becoming saturated. The "remote valves" shall be placed on a bed of gravel or screenings (4"-6"). Positive grade away from valve boxes is encouraged to reduce the volume of groundwater that may collect in valve box. Certain sites may require positive drains to daylight.
6) All loops connecting drip runs with 1/2" flexible PVC shall be slightly elevated (minimum 1"-2") so that they drain into the drip tubing after the pump shuts off. It is contractors responsibility to ensure these loops stay elevated during and after the loops are backfilled.
7) All main supply and return trenches to be installed below the local frost line. If this is not possible due to site restrictions then adequate soil must be added over the top of the trenches so that the effective depth re-mains below the frost line after settling occurs. The added soils must be prepared for turf cover and stabilized. If vegetation cannot be established then trenches are to be covered with an additional layer (minimum 6") of mulch, straw/hay, etc. until such turf cover is established.
8) Sufficient ground cover around the hydraulic unit is required to insulate the unit. All pipes entering and leaving the hydraulic unit shall elbow vertically down 90 degrees to a depth below the frost line prior to extend-ing away from the unit horizontally. Additional insulation inside the hydraulic unit is encouraged. Insulation to consist of either blue board, bagged Styrofoam peanuts or equivalent. If fiberglass insulation is used it must be sealed to prevent it from becoming saturated.
9) All conduit entering into the control panel shall be sealed to prevent condensation inside the panel.
10) Established vegetation height shall be minimum 4"-6" throughout winter months.
11) Air release valves shall be placed below the ground surface inside a valve box but at an elevation above the highest drip line in that particular zone.

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EASTGATE ESTATES
LAKE COUNTY, ILLINOIS

GENERAL NOTES AND SPECIFICATIONS

DATE	BY	NO.	REVISION

SHEET **11** OF **11**

DATE: **7/25/2006**